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# CINEFEX

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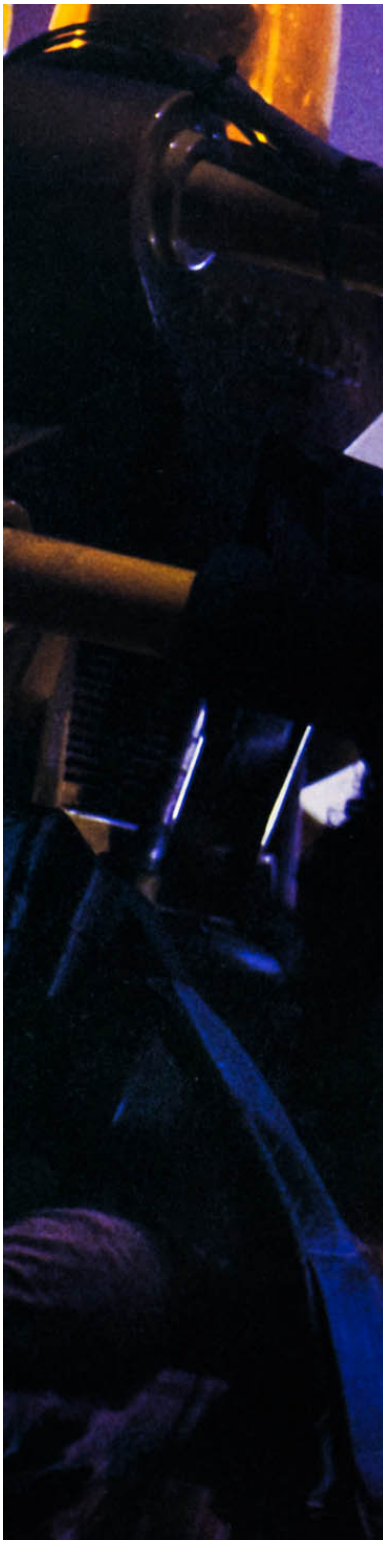
Aliens ..... 4

In the seven years since its release, Ridley Scott's *Alien* has endured as the quintessential science fiction horror film — a stylish thriller and boxoffice favorite that spawned a rash of forgettable clones but somehow defied legitimate efforts to generate a worthy sequel. A fresh approach was clearly in order, but that approach proved evasive until writer-director James Cameron was afforded the opportunity to develop his own scenario — an action-packed roller coaster ride that succeeded admirably in retaining the essential elements of the original without being fettered by them. Despite a studio analyst's estimate that Cameron's *Aliens* script would cost $35 million to make, producer Gale Anne Hurd mounted the ambitious sequel in England — bringing it in for a remarkably frugal $18 million. Of crucial importance to the cost curtailment effort was the need to keep the film's extensive special effects from spiraling out of control. Striving for high-quality work with low-level technology, Cameron and Hurd assembled a team of professionals that included conceptual designers Syd Mead and Ron Cobb, production designer Peter Lamont, visual effects supervisors Robert Skotak and Dennis Skotak, postproduction supervisor Brian Johnson, alien effects creator Stan Winston and physical effects supervisor John Richardson. These and other effects artisans discuss in detail their work on the film and the time-pressured campaign to bring *Aliens* into being. *Article by Don Shay.*

FRONT COVER — The alien queen on a quest for vengeance in *Aliens*.
A drop-ship makes a landing approach in *Aliens* — BACK COVER.

# ALIENS



*article by*
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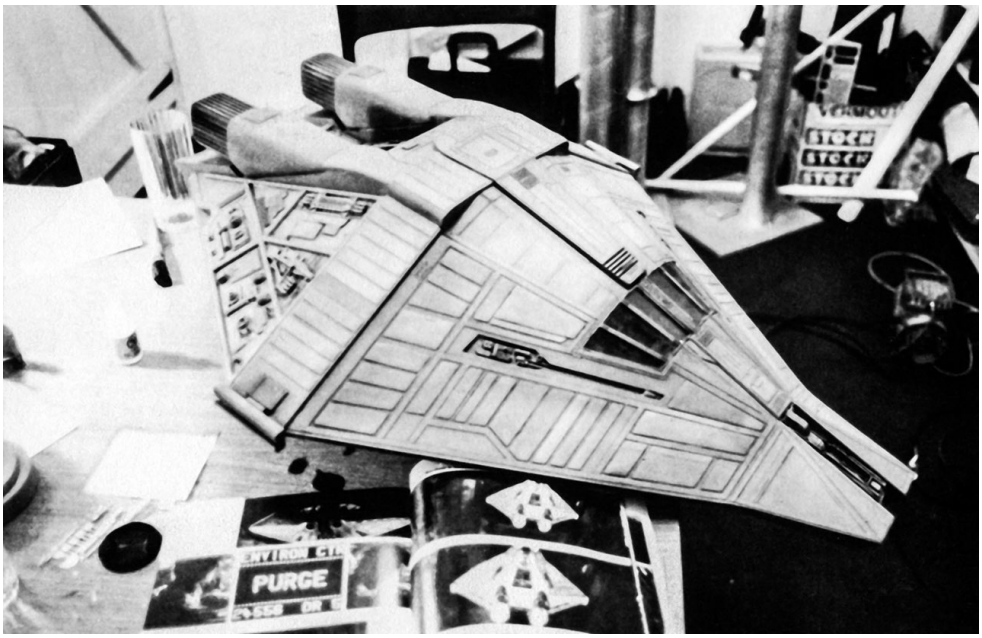
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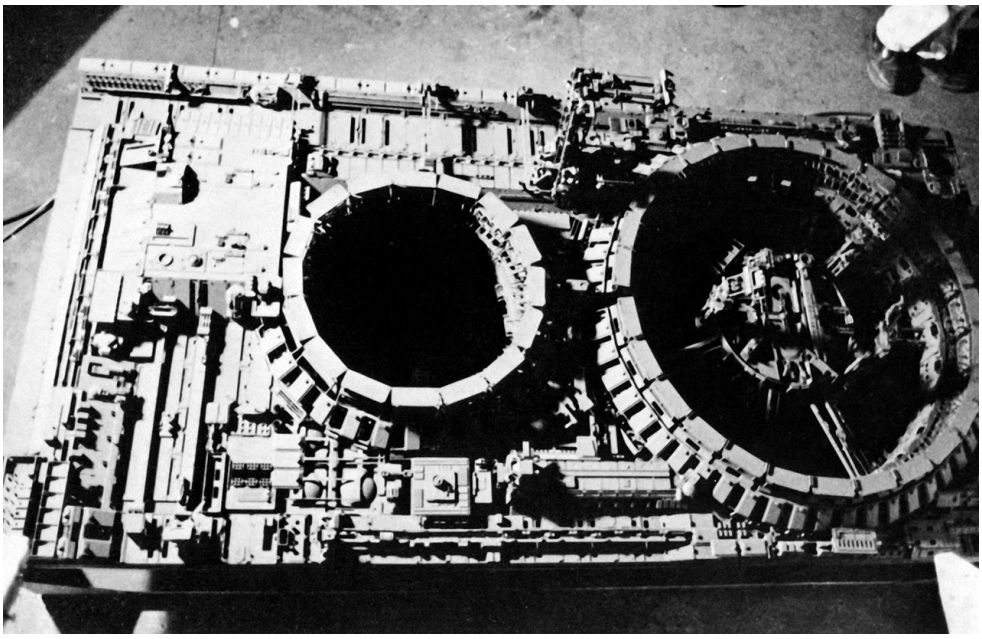
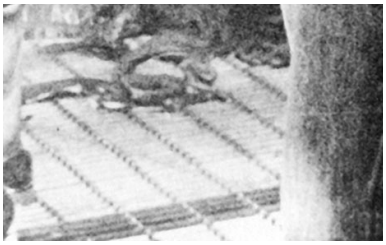
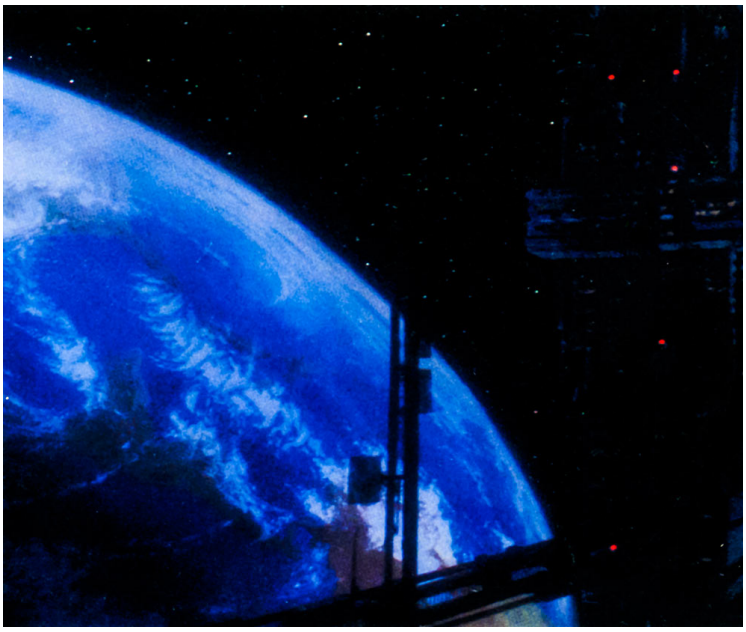


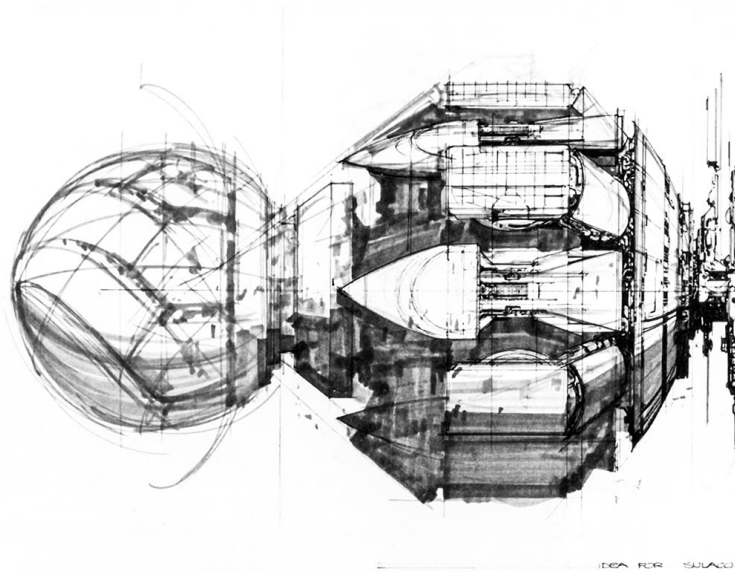


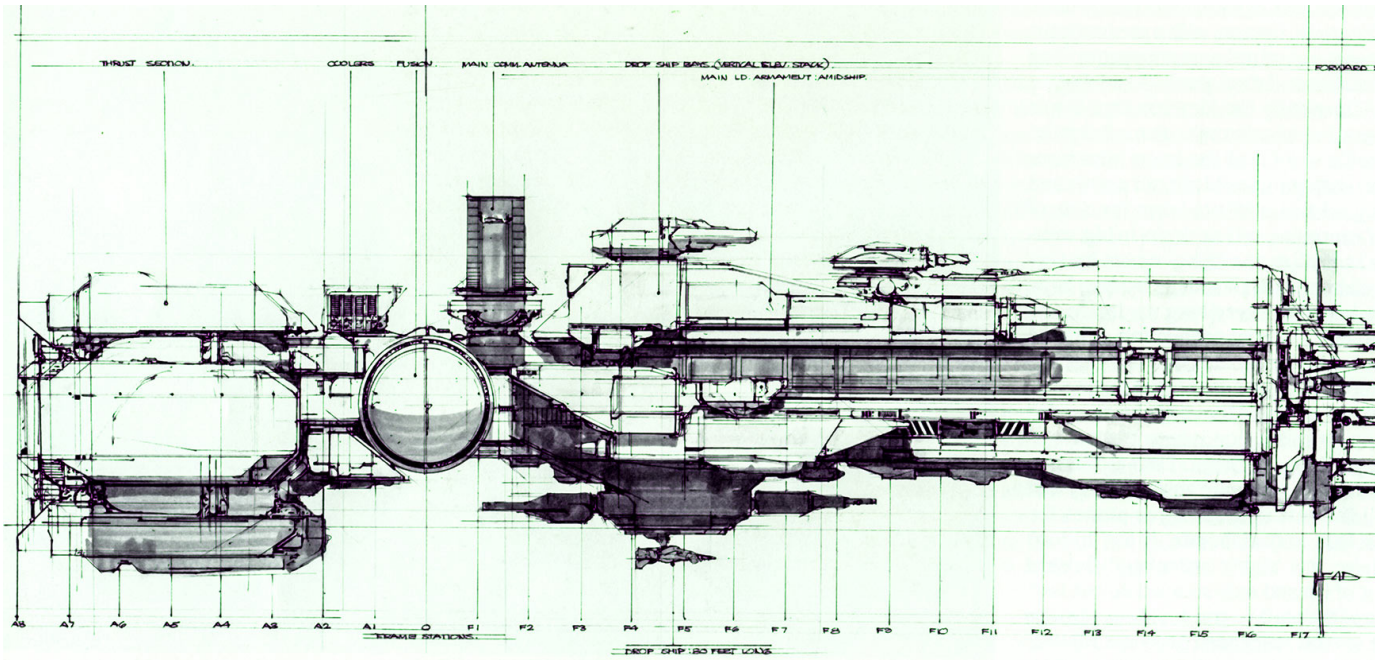
concept — blocky in some sections, spindly in others — bore marked resemblance to a futuristic firearm, with a predominant cargo hold section in the center, a giant antenna array protruding from the front, and crew stations, living quarters and engine components in the rear. "Essentially the idea was that it was a military load-carrying vessel — an enormous space freighter, if you will. In terms of profile — a lot of the tower structures and things — I used for inspiration some old aircraft carrier and battleship shapes, stacking all this stuff up. Down the side of the ship I put a long row of enormous, roll-up doors in big, over-engineered heavy frames so that as the thing moves by very slowly you can see all the elaborate detail and the loading bays. In movies, you don't have to match everything up, inside and out, but there has to be a logical visual connection. I figured that with drop-ships mounted inside, we'd need a bay that was about a hundred feet wide, so that's what I used in approximating the scale for the rest of the ship. Behind the cargo bay were the big drive shrouds. In theory it was a fusion sphere of some sort that drove the engines to produce the thrust. Then at the very front, projecting forward, was this elaborate antenna array that looked like you could call the next universe if you pushed the right button. So it had to look very elaborate, it had to look gigantic and it had to have this highly articulated finished appearance to it. And a lot of ins and outs so it would not look like a solid object covered with detail — you could see through different parts and in and around suspended pods and things."

While Syd Mead labored in relative seclusion, Ron Cobb's initial involvement entailed a series of brainstorming sessions with Jim Cameron. "I didn't see it exactly as science fiction," said Cobb. "To me, it was kind of a stylized fantasy on technology — almost satirical in a way — as was the first one. The original film had people trapped in a machine — a metaphor for the industrial world, perhaps — but the inherent elements of humor were mostly submerged. *Aliens* struck me right away as a grand takeoff on Vietnam, with all of these odd echoings of *Apocalypse Now* or something. There was a rich, witty aspect to the picture. It's not a projection, truly, into the future. It's more like a contemporary war film. From the vehicles to the weapons to the patches on their uniforms, it's more a reflection of Vietnam than it is the future."

For reasons of economy, it was decided that England would be the best place to shoot the ambitious sequel. "Not only would it cost us less," said Gale Hurd, "but there seemed to be such a continuity in respect to the film in England. *Alien*, of course, was shot there, and numerous technicians who had worked on it — and who had since risen to greater heights — were still around and available to work for us in more senior capacities. Not that we were trying to recreate what had been seen in the first film — ours was to be very much different — but that sense



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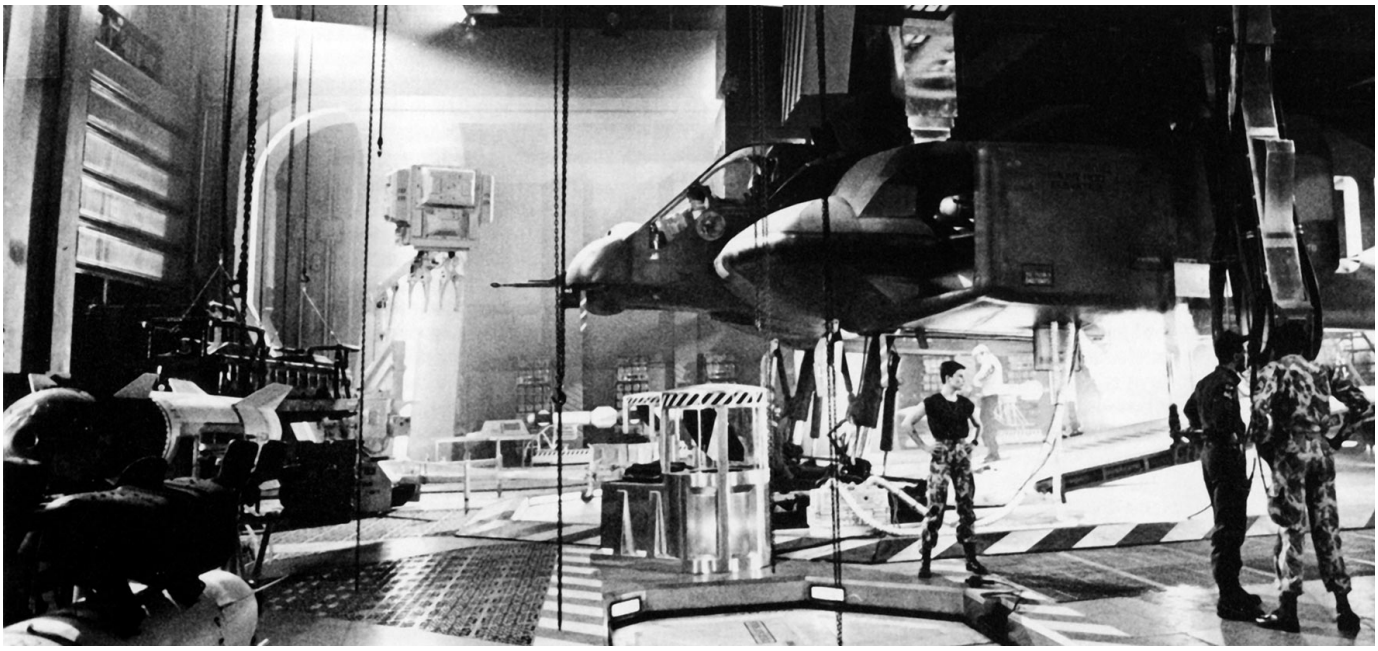
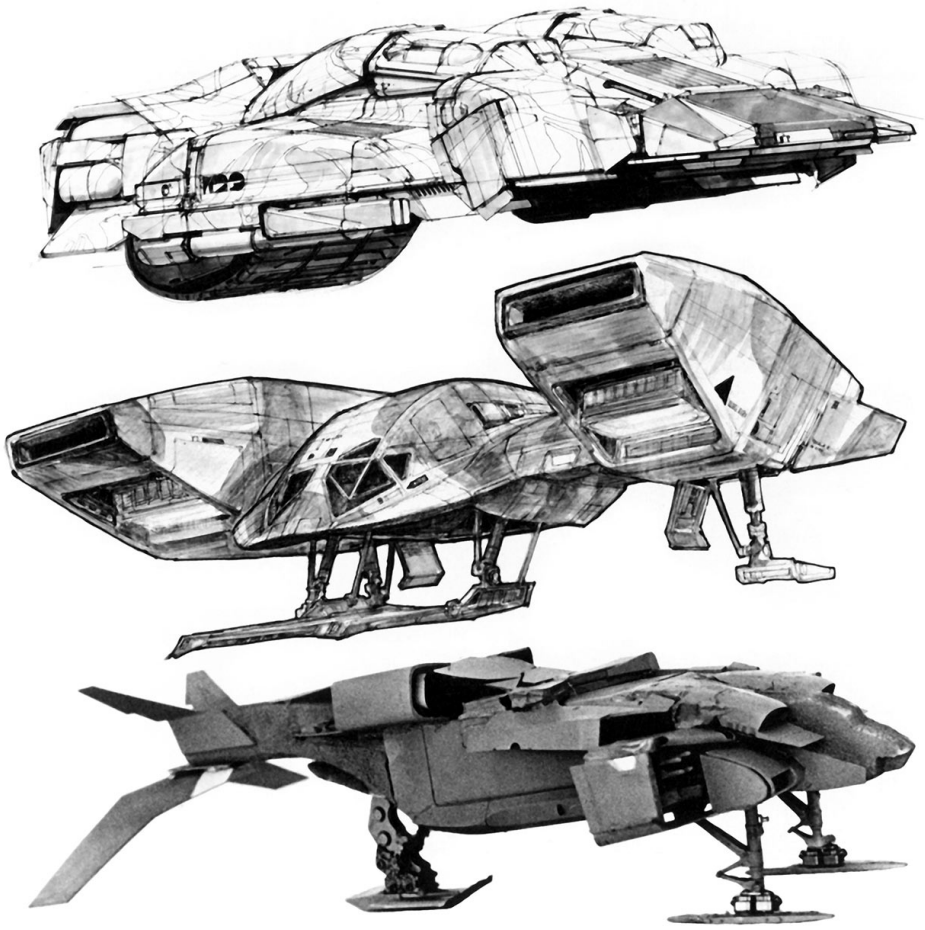




that's what I gave him. My feeling is you
try at predicting the future or you can di
that we all experience the future as it c
it's almost more powerful to evoke a fu
quirks in it than it is to predict in a ver
actually be. Inevitably, that becomes
probably no more accurate in the long r
really, was that the designs have a stro
component. If we were being serious abc
that the colonists would even try to bu
like that. They'd probably go undergrour
we'd have missed out on dusty street
against the wind — the real frontier we

Because of its overall length, the col
laid out diagonally on one of the Pinew
at that, some of the buildings in the rea
in forced perspective. Fully assembled,
the makeshift boomtown flanked each
road that led off toward the atmosphere
flyover shots," McClung continued, "
colony that was about eight-foot squar
and modules and so forth. That was
monitor footage which we shot directly
doing it on film and then transferring it.
one at one point — a very quick one.
made up a little wooden building bloc
could play around with it and lay out
of the colony. We took that, painted it b
and set it far off in the distance — and

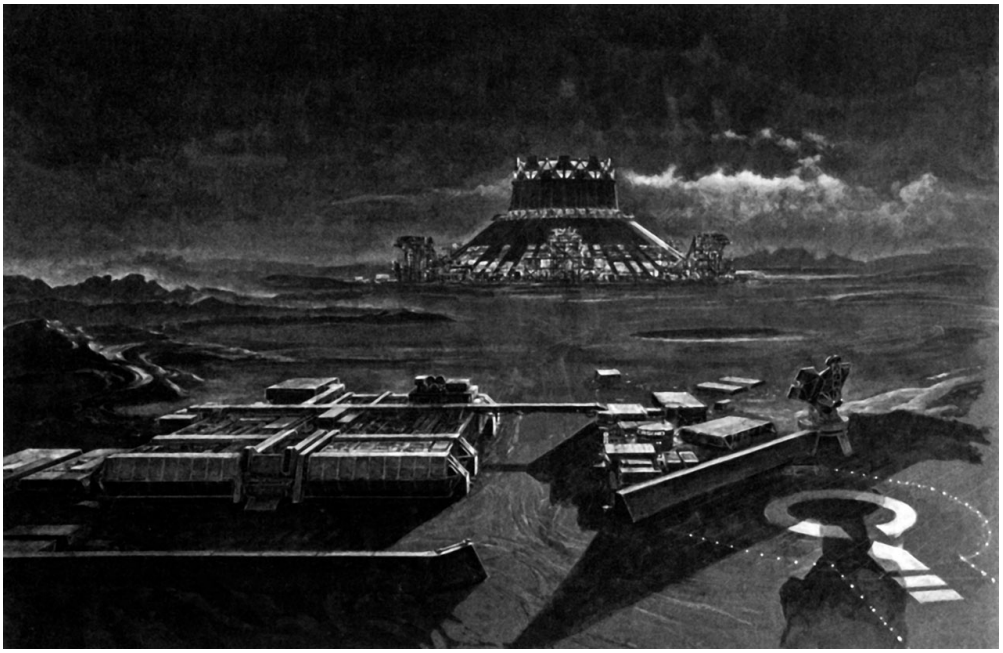
The smallest of the colony miniature
element in conjunction with the atmc
tion — another priority project for the n
station started out looking pretty muc
commented. "That was an idea Jim an
a lot of drawings. I did a lot of drawing
was more his concept than mine." Cam
was that it be made to look *big.* "Ron
just a conical shape," said Cameron, "a
ence — having worked on a film for Rog
*of Terror* where one of the main object
the approach to something with walls t
basically defies perspective from grou
becomes very hard to create a sense o
that problem, I added some outward radi
so that the station would come forwa
approached it." Since the atmosphere
separated from the colony by about a
seen by itself, it was not necessary to con
scale. Thus, a six-foot model was const
thousand-foot-tall facility.

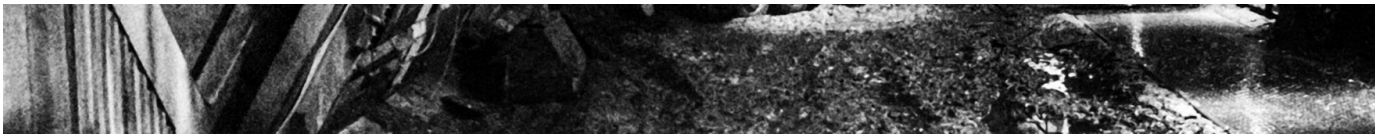
time we left for England. All the molds and the mechanics and the skins were sent ahead, and over there a second articulated chest-burster was developed by Steve Norrington. That one had even more life than the first — mainly because it didn't have to push through anything so it didn't have to be as strong."

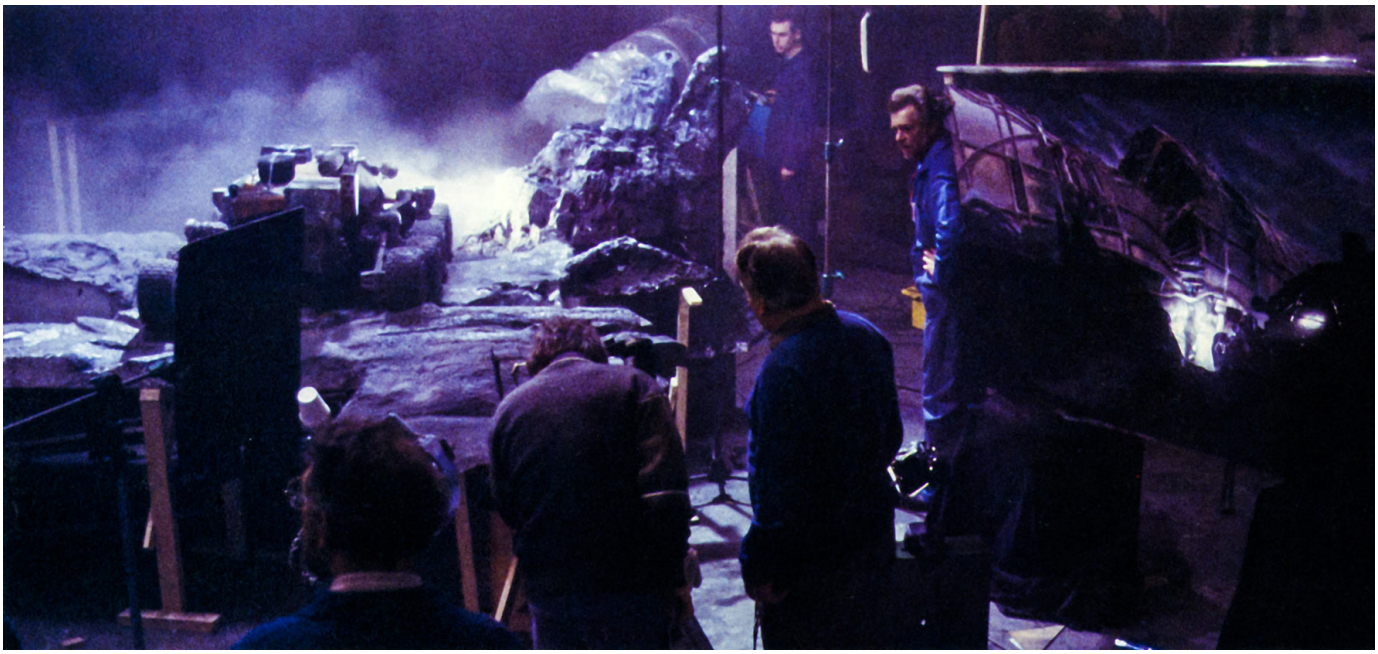
Curiously, one of the major traumas involved in executing the chest-burster effect for the first film — getting the victim's shirt to tear appropriately and on cue — proved to be just as much a dilemma for the second. "There was no problem getting the chest-burster through the body," said Winston. "The foam rubber was hollowed out and the skin was prescored and the chest-burster itself was built on a big metal harness that fit onto one of our operators' arms. All we needed was for him to punch it through from below. But we had a helluva time trying to get the shirt to do exactly what it was supposed to. Luckily we had about six of them. They were all pre-distressed so they would tear easily, but throughout the takes there were times when the chest-burster wouldn't make a clean exit or blood would hit the shirt before the breakthrough or something like that. It was rough on everybody, psychologically and otherwise. So much thought and energy went into that whole sequence that to sit there on the set thinking you had all your bases covered and have the T-shirts, of all things, not react the way they're supposed to — it was frustrating. Jim was going crazy and I was going crazy."

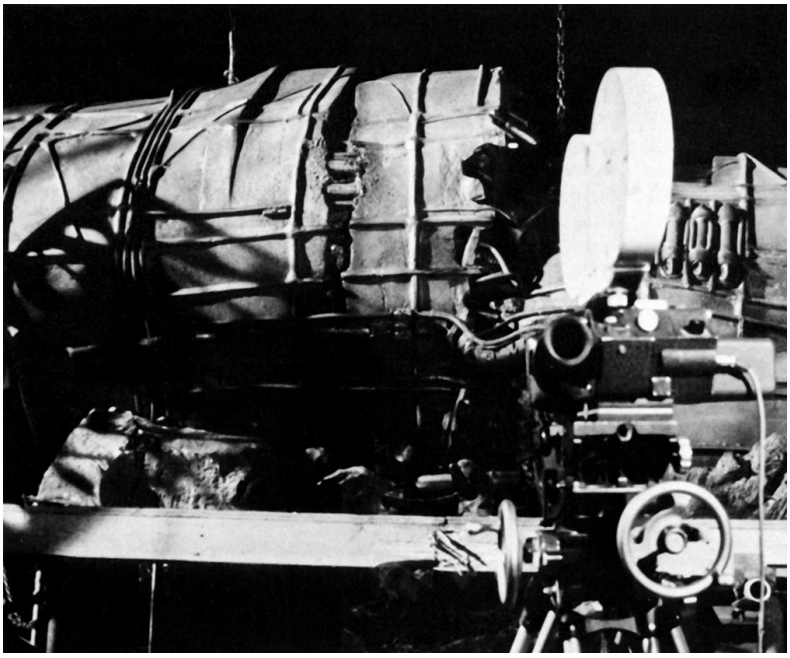
After the chest-burster breaks through — killing its host in the process — the troopers open up on it with flame-throwers. "For the last scene, we built a complete duplicate of the actress in her death position — head, body, everything — which we then put into the set. At the same time, we replaced the original chest-burster with the one Steve Norrington had made and had it writhing around and really going crazy. The movement was stupendous — that little sucker was really *alive!*" When all was ready and the desired action achieved, Cameron gave a signal and the whole setup was torched.

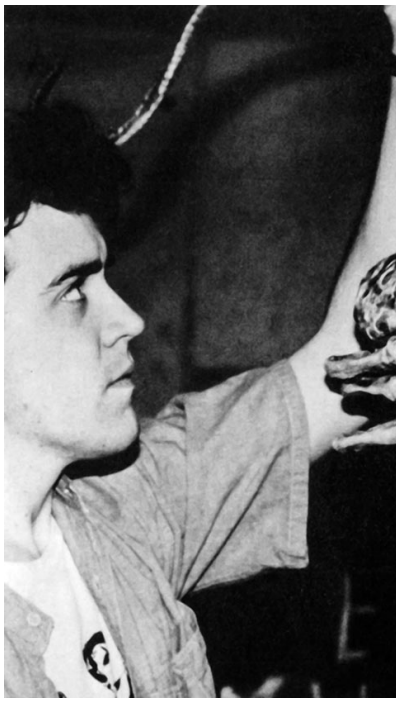
"We built all the flame-throwers from scratch," said John Richardson, "because they had to be totally self-contained, even in terms of the fuel they fired. And obviously, they had to be very carefully designed since the artists had to carry them and use them. After we built our first one, we took it up to the art department so they could come up with a cosmetic shell for the outside of it which we then dressed onto the gun. In the end, we built a whole range of them. Depending on which one we used, we could get a jet of flame anywhere from forty-five feet down to five feet. It was a bit like playing golf — you had to pick the right club for the right hole. And again, depending on how far we wanted it to fire and what we wanted to see happen when it hit at the other end, we had a choice of two different fuels. Most of the time we used propane gas which tends to use











*The first of Stan Winston's creatures to appear on screen was the alien face-hugger which — unlike its predecessor in* Alien *— had the ability to run about and climb with its eight spindly fingers. Tom Woodruff examines one of the rigored creatures constructed for use in the med lab statis tubes. / Shane Mahan dresses another for a dissection scene. / One of the statis tube face-huggers — still alive — had to be equipped with a cable-actuated tail and tongue that could be operated underwater. / Gorman (William Hope), Bishop (Lance Henriksen), Burke*

"The drop-ship was something that I could see very clearly in my mind," Cameron explained, "but for some reason I couldn't seem to draw it. It was like being tongue-tied when you're a public speaker. It just defied me. The main problem was not the overall configuration, but the variable geometry concept of having the gun pods fold out and lock into place. Finally what I did was drive in to the studio one weekend and build a model of it. Then I gave it to Ron Cobb and had him do what he calls 'package it.' The finished design was pretty much what resulted." Decidedly nonaerodynamic in appearance, with retractable landing skids, the ramp-bottomed drop-ship was heavily armored and capable of airlifting a combat-equipped APC and discharging it from a near-hover. In its fully deployed configuration, the craft suggested a mechanoid insect bristling with high-tech firepower. With armature retracted, however, it more appropriately resembled a helicopter gunship without rotors. "Specifically it looks like an Apache AH-64 helicopter," said Cameron, "which isn't too surprising since that's what I started from. What I wanted was to suggest an existing piece of military hardware and then extrapolate beyond that and make it a transatmospheric vehicle. Obviously it wouldn't have rotors, but it does have VTOL (vertical takeoff and landing) and vectored thrust and things like that. Even the motion of it is very helicopter-like. The nose drops down when it accelerates forward and the ship sort of spins in place as it descends. All of that was very intentionally imitated from helicopter movements."

Once its basic structure and cosmetic details were settled upon, the approved drop-ship designs were rushed to the model shop. "In a sense, there wasn't a main supervisor for the model shop," said Pat McClung. "Since there was so much to do, most of the jobs were just divided up. The drop-ship, for example, was overseen by Brendan Alimo, one of the guys from the art department. The basic model was about six feet long — one-twelfth scale — and there must have been eight or ten of them built. The pattern for it was made by Peter Astin, an outside contractor who also produced the fiberglass shells that were then brought over to the model shop for detailing. Only one of them was fully mechanized with retractable landing gear and unfolding weapons pods and a door on the bottom for the APC to come out. The rest were built in the fully-deployed position. Some of them — like the one which is lowered into the pressure lock inside the miniature cargo hold — were very carefully detailed. Others only had to crash and blow up, so they were constructed a little more crudely."

It was the 'crash-and-blow-up' models that would be needed

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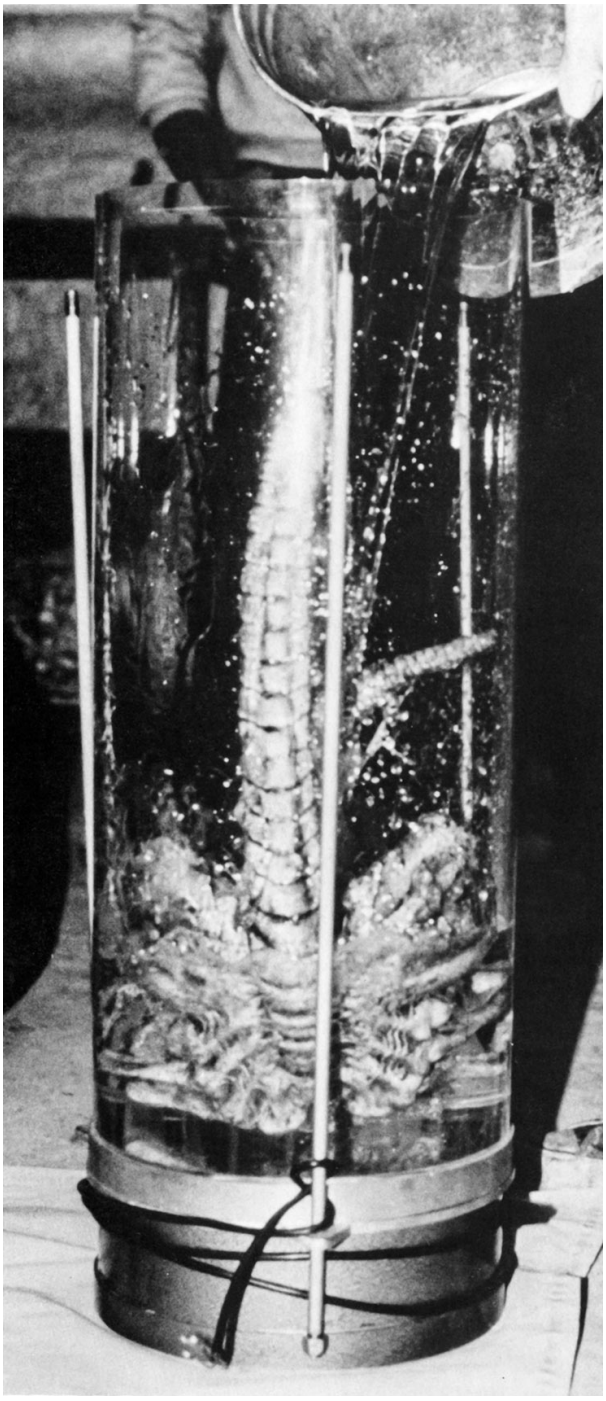

ics came out of stuff as simple as that. We'd be wondering what sort of fancy doodad to come up with for a particular shot and Jim would say, 'Let's just make up a bunch of dummies — we'll throw them and blow them up.' And for quick cuts that worked."

Also begun in the United States was the time-consuming task of devising and constructing a face-hugger that could scuttle convincingly across the floor. "I wanted to do a pull-toy type of thing," said Winston, "where we would literally pull it across the floor and a wheel would turn underneath or something and cause the legs to move. In a way, that's pretty much what we ended up doing; but at the start we couldn't quite figure out how to do it so we got off on a few tangents. One of the ideas Jim had was to use either a high-torque electric motor or a little model airplane gasoline engine. I have so much respect for him that I'll try anything he comes up with, but we were getting nowhere with that idea. Finally Jim called me from England and said: 'I don't know why I didn't think of this, Stan, but I did this thing for *Piranha II* where a fish was pulled through the water over a wire and we had a little mechanism inside to make the tail wiggle.' So, working from that idea, he drew out a little design of what he thought the insides could be for the face-hugger, sent it over here, and Rick Lazzarini proceeded to make it work — which was quite a job since there were still an awful lot of problems to overcome. The face-hugger was on a wire that wrapped around a rubber-surfaced gear on the inside and was held taut by two operators on either end. Pulling the face-hugger along that wire would cause the gear to move which in turn would move other smaller gears connected to the legs. The gearing mechanism turned out to be very intricate, but the simple brilliance of the idea was that there was a correlation between how fast you pulled the face-hugger and how fast the legs would go. If you pulled it fast, the legs would move fast; if you pulled it slow, the legs would go slow."

Though process plates would continue to be needed throughout the production, once the most pressing ones were completed the effects unit could begin directing its attention into other areas. By now the sixth-scale colony miniature — extending from one corner of M stage to the other — was ready to shoot. Ten shots, in all, were planned — most earmarked for the ill-fated opening sequence designed to establish the colony and its workaday routine. Low 'eye-level' camera angles were used exclusively to impart the sense that a real environment — not a miniature — was being photographed. Dust and debris were blown about with giant wind machines and radio-controlled

ics came out of stuff as simple as that. We'd be wondering what sort of fancy doodad to come up with for a particular shot and Jim would say, 'Let's just make up a bunch of dummies — we'll throw them and blow them up.' And for quick cuts that worked."

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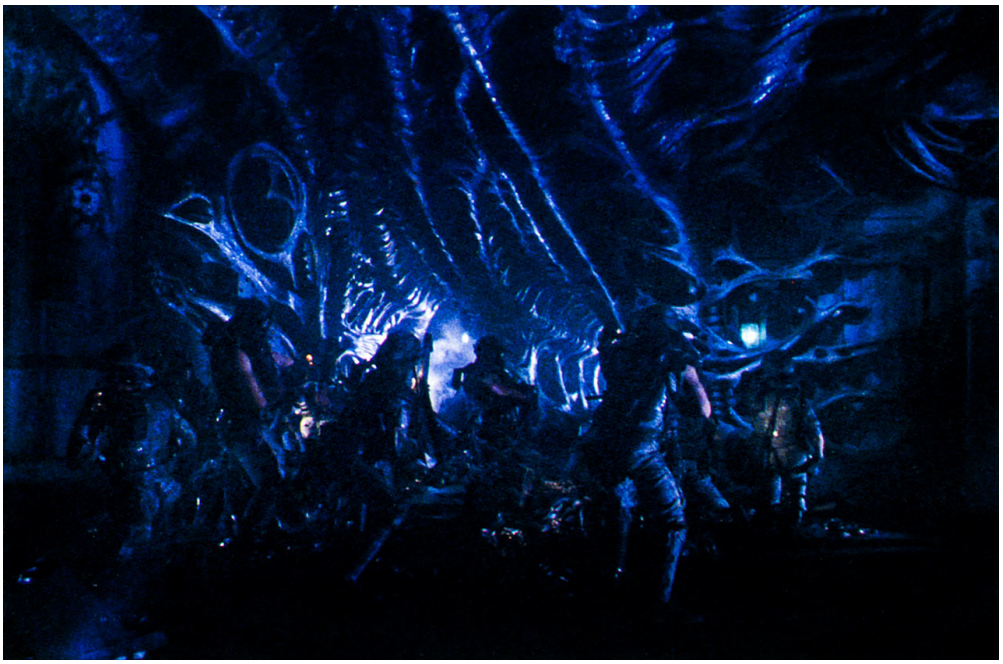

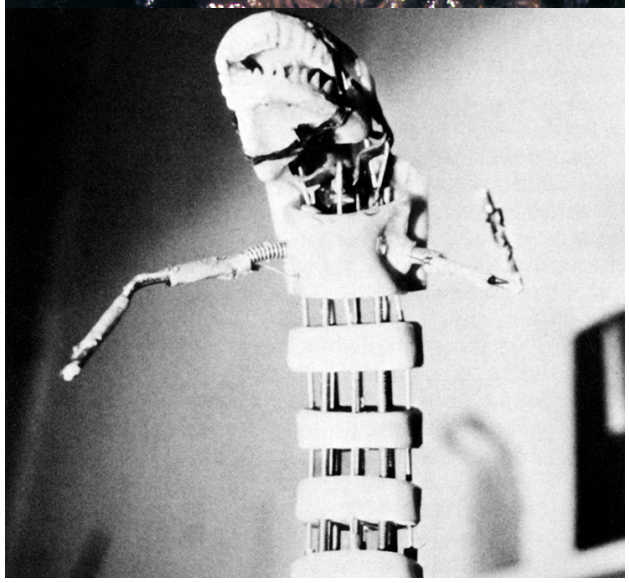

the stage — visible through the opening — a full-scale vehicle was positioned against an appropriate backing. By carefully aligning the camera and pumping enough light into the stage to maintain full depth-of-field, the distant vehicle could be made to look as though it were on the same plane as the miniature. Thus, as the camera followed the radio-controlled vehicle down the sixth-scale street, in the alleyway behind — or at least apparently so — two colonists could be seen covering their full-size vehicle with a tarp.

The second shot — also achieved in-camera — was somewhat more complex. A scene was desired showing a couple of people entering the boomtown's well-trafficked saloon. "Since the only set we had was a miniature," said Dennis Skotak, "what we did was build a small section representing the doorway leading into the bar. We came up with a massive safe door that was actually a stock unit from another film and we dressed it up to give it our characteristic Acheron 'bad-side-of-town' look. We even put a Stroh's neon sign on the wall. Jim was very much into that sort of thing. He felt that in order to relate to the future, there needed to be a sense of immediacy about it. That's why a lot of what we did — even the vehicles and the tractors — are just extrapolations of what we have now. Anyway, once we finished our full-size doorway area, we positioned it at 90 degrees to the colony set. The camera faced the full-size set, shooting through a large sheet of glass placed at a 45-degree angle to the camera. For the area we wanted to extend with the miniature, we backed the glass with black paper. Then we reflected the image of the miniature colony complex into the glass, balancing the lighting so that the two areas matched. Basically, it was an in-camera split-screen that allowed us to line everything up and monitor the shot right through the camera rather than shoot two separate pieces and put them together in an optical printer."

The bustling complex would have a different appearance later in the film when the colonial marines arrive in their armored personnel carrier. Aside from a few abandoned vehicles, the streets would now be empty. "When the troopers first land on the planet, it's raining," said Pat McClung, "which created quite a mess. The stage floor was covered with plastic, and on top of that was a layer of ash that had to be wetted down. I'm not sure exactly what it was, but it was really dirty stuff and everybody complained about it for months. We needed it though because Jim wanted our miniature APC to kick up all kinds of mud and splatters as it drove by. The set looked pretty good. We had things like doors slamming in the breeze and little lamps flopping back and forth — typical ghost town stuff — and we used little silicone sleevings for cables that were slung around and dangling in the breeze. Then we had pressurized insect sprayers filled with water that sprayed a fine mist in front of the camera so it would look like a light rainfall. It gave everything a nice sense of scale. And

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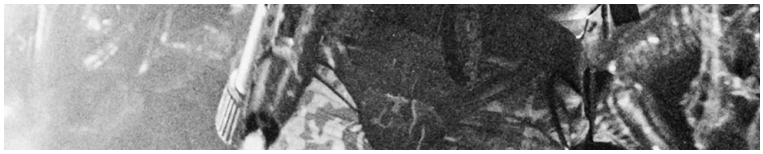

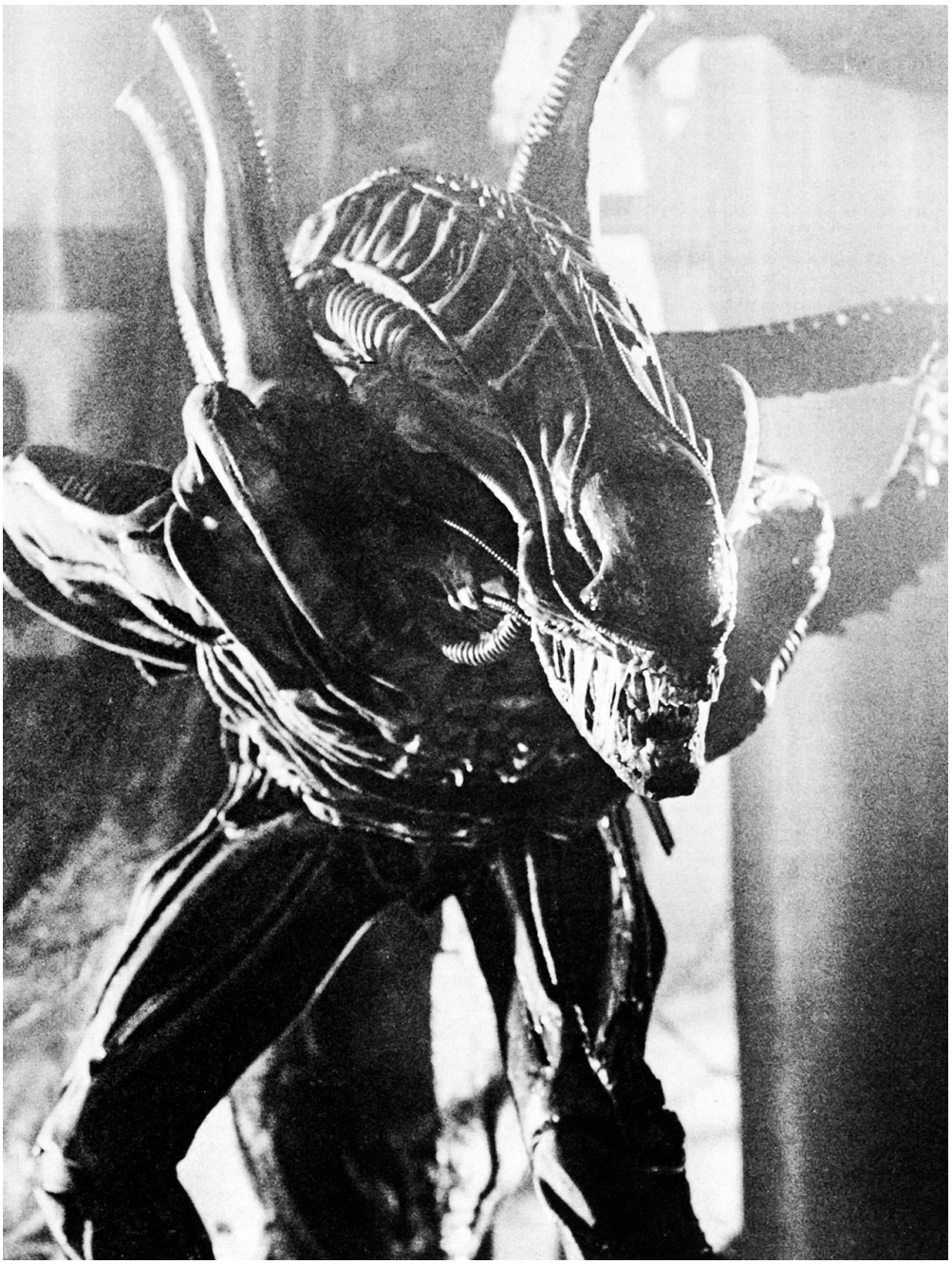

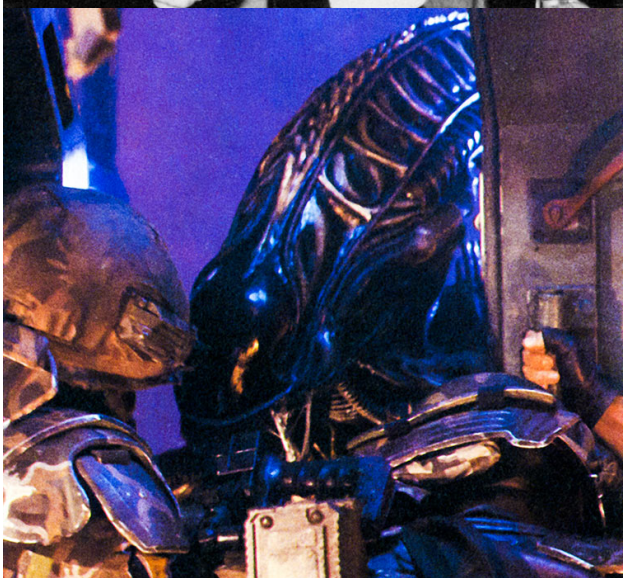

in-camera compositing techniques for the film — were also employed in the derelict sequence. To obtain a shot of the tractor pulling up to the base of the monolithic craft, a tabletop landscape setting was quickly assembled in front of a black backdrop with the camera shooting up from apparent ground level. Between the camera and the set was a beam-splitter which reflected into the black backdrop area a large side-mounted painting of the derelict rendered by Peter Melrose and refined by Bob Skotak. By careful alignment through the camera, Skotak was able to mask the lower portion of the painting in black to correspond with the miniature landscape and tractor and thus produce a seamless in-camera matte. A later shot of the Jordens standing outside the derelict was achieved with the enlarged fifth-scale mockup used earlier in the plate photography. By placing the actors well to the rear of the model and carefully aligning them through a crack in the hull, large amounts of light and a deep-focus lens made them appear to be standing in the foreground looking up at the ship.

"To justify for the die-hard fans why the acoustic beacon from the first film was not picked up by the colonists and why they were therefore unaware of the existence of the derelict," Cameron noted, "we had the ship smashed sideways into a rock and partially broken up by a recent outflow of lava. And when the Jorden family — the mother and father — go inside, they don't go in through the portals that the original party used. To give things a somewhat different look, even in that one area where I was following directly in the footsteps of the other film, I had them go in through a large rent in the hull. Inside, one of my first ideas was to do a scene where they actually find the egg chamber and all the eggs come to life. But it would have cost us a million dollars just to create the same basic imagery we'd already been shown in *Alien*, so I decided to treat that whole aspect as inferred. We know what's inside the ship — we don't need to see it again." By extension, the same philosophy applied to the sequence as a whole. When Cameron's tightly-edited final assembly checked in at slightly more than two-and-a-half hours, he and Hurd agreed to cut it back by fifteen minutes. In the process, both the colony prologue and derelict rediscovery were jettisoned.

Elsewhere on the lot, Peter Lamont and his crew were still scrambling to keep ahead of the first unit. Working from his own concepts for the Gateway station, Ron Cobb's for the colony and Syd Mead's for the *Sulaco* — each filtered through the critical eye of Jim Cameron — the veteran production designer had more than an adequate amount of outside input. "I've been around long enough to appreciate all the help I can get," said Lamont. "What matters eventually is what you see on the screen and not who started the inkling of ideas — things spring up and

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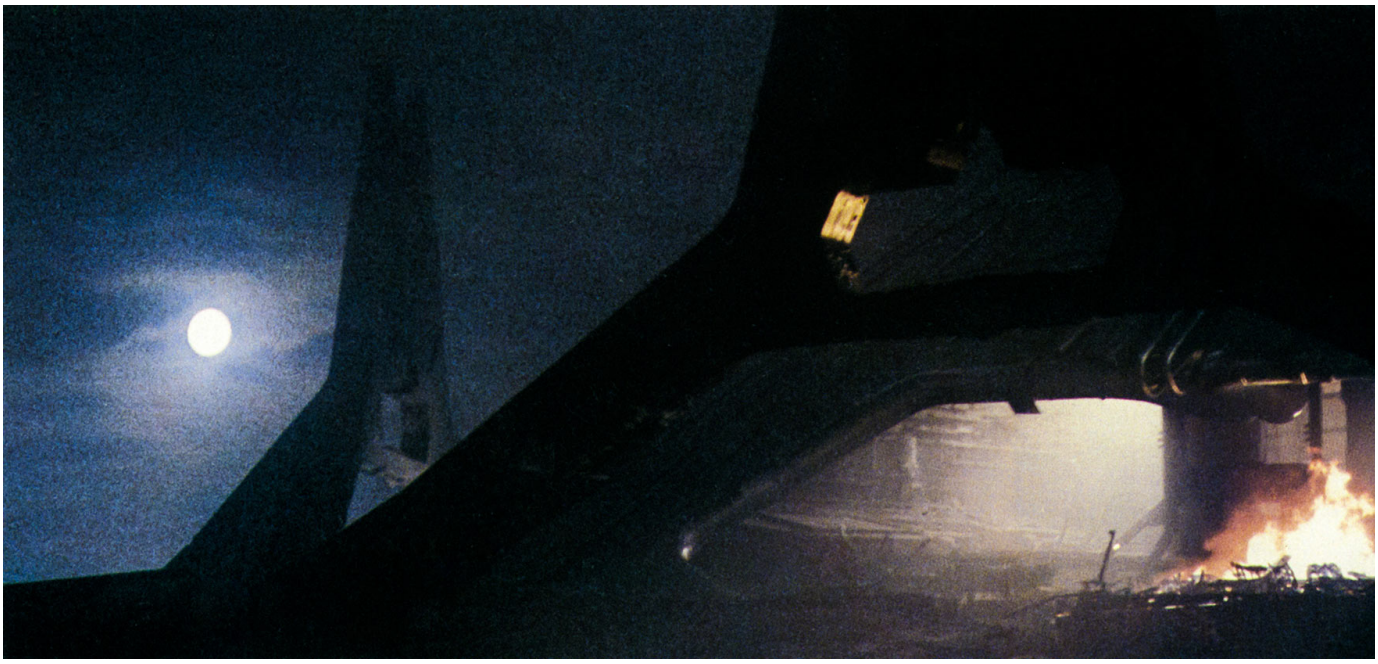
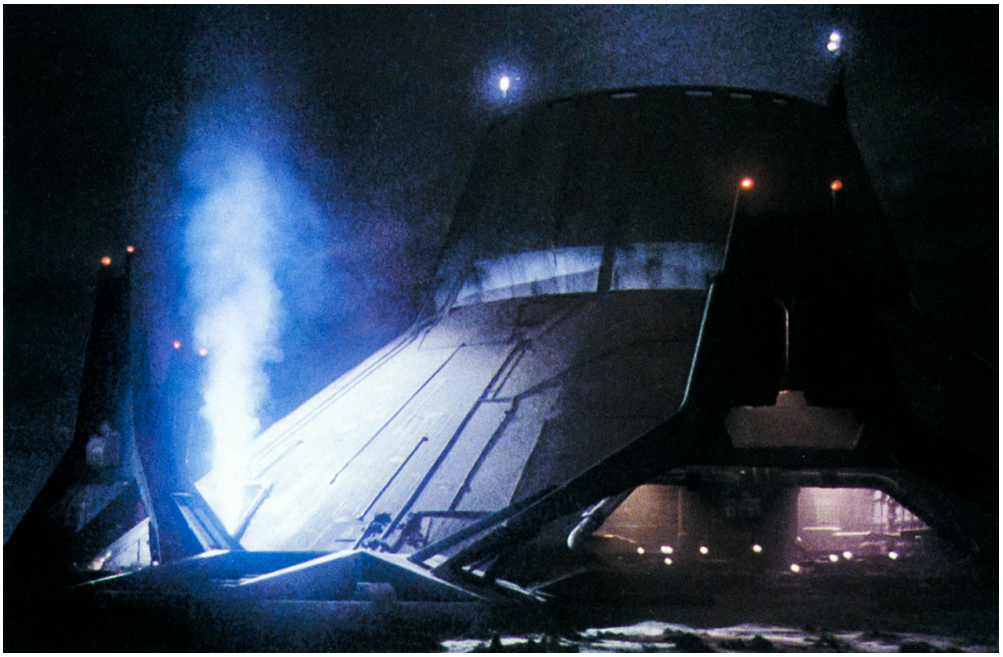
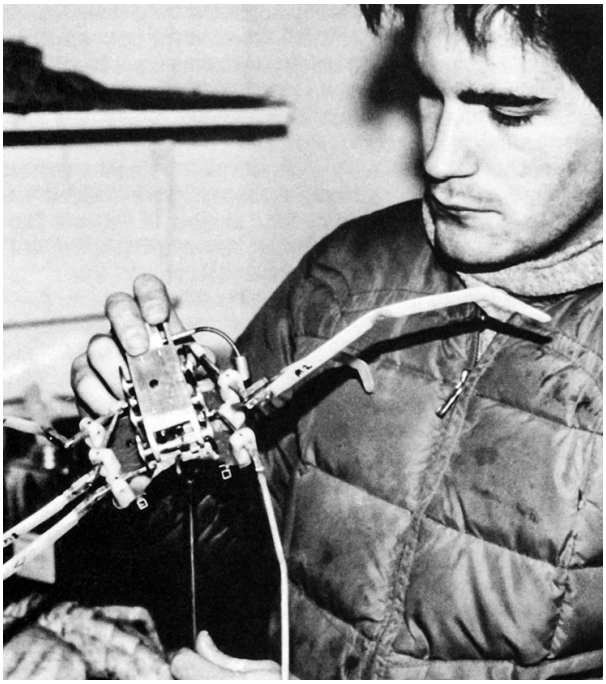
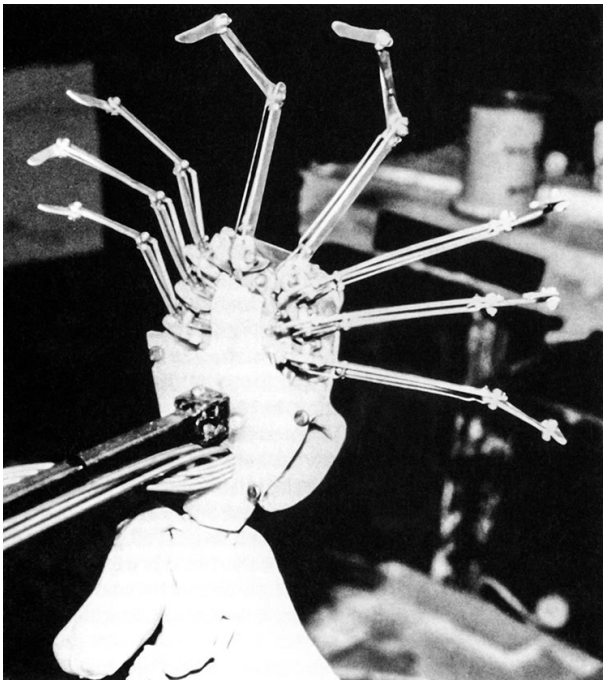
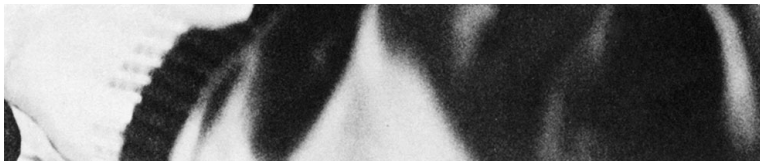










realized that most of them would requir
turns and spins and rapid strides — the
stop-motion would cause so much displ
the arms and legs would end up strobin
just can't do in any other way, though,
was to have a rod puppet version *and*
But eventually it got down to budget a
of either one or the other. Given that, the
puppet seemed more appealing for a n
was that I had never worked with that k
I wanted to fool around with it and see w
I just had a feeling that with a lot of th
using — smoke and steam and that sor
more flexibility with puppets we could
ture set."

Meanwhile, the queen project was st
of the miniature prototype. To facilitat
assembled a team of sculptors — incluc
nent crew — and divided up the work.
given the body; Alec Gillis and Willie W
Greg Figiel took the arms; Brian Penik
worked on the tail; and Shane Mahan sc
the miniature queen was coming toget
preliminary work on the full-size versi
"The first thing we had to do was build
queen," Winston explained, "the strong
would hold the stuntmen and the strong
that would carry the hydraulics. That inn
part dictate the size of the queen's bo
to work that out in advance." Rick Laz
inner body fabrication, assisted by m
Once completed, it was shipped to Lon
the queen construction would be under

Immediately upon finishing the minia
necessary molds and castings, Stan W
contingent departed for England. "We
effects stage at Pinewood and began
components of the queen — which bas
built and sculpted exactly as we had do
tures were built for the legs and arms a
tail — all separately. The simplest arma
tail so I decided we should do that first
by any stretch of the imagination, but th
easiest to build quickly and I figured it
in project for my English crew to help
strengths and weaknesses. Once the tail
could then go to clay on it while the res
being built." As they would throughout,
Landon did most of the mechanical work

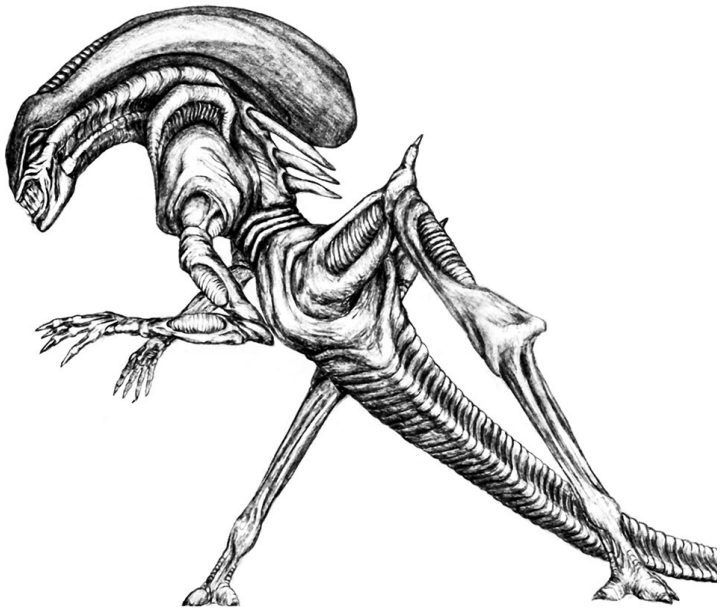
fake torso attached to him just under his armpits and over his shoulders."

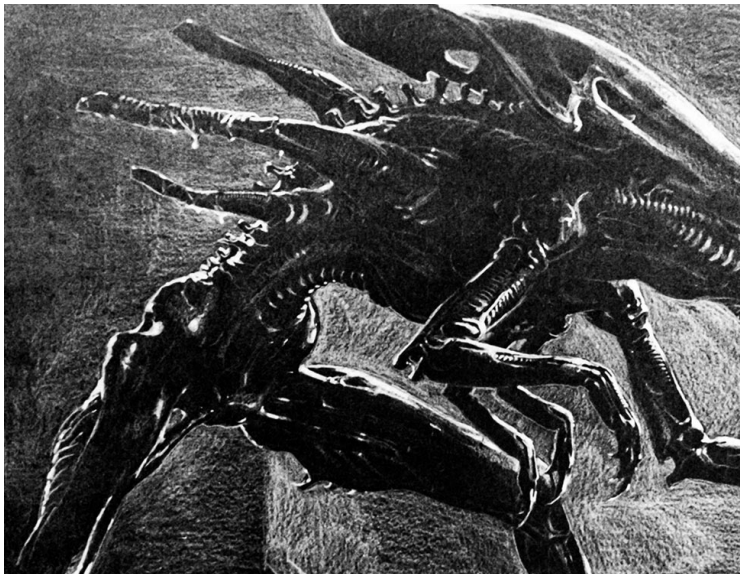
Not surprisingly, the scenes where the full-size alien queen had to be shown from head to foot were among the most difficult for Winston and his crew. "For the scene where she lowers herself down from the drop-ship, we ran wires from the pivot point on her back up through the ship to the top of the stage. Our stuntmen were inside operating the arms and we had wire riggers off to the side lowering the queen down onto the ramp. Other wires connected to the knees and to the ankles allowed the legs to be controlled from above too. It was like a giant marionette. And so the moves wouldn't look floppy, we ran additional wires from her ankles to specific landing points so she could step down firmly into a dynamic position. Her tail also had to uncurl, which meant other wires and other puppeteers. It was pretty rugged. Jim had multiple cameras going and we did it a multitude of times, but the shot was worth it."

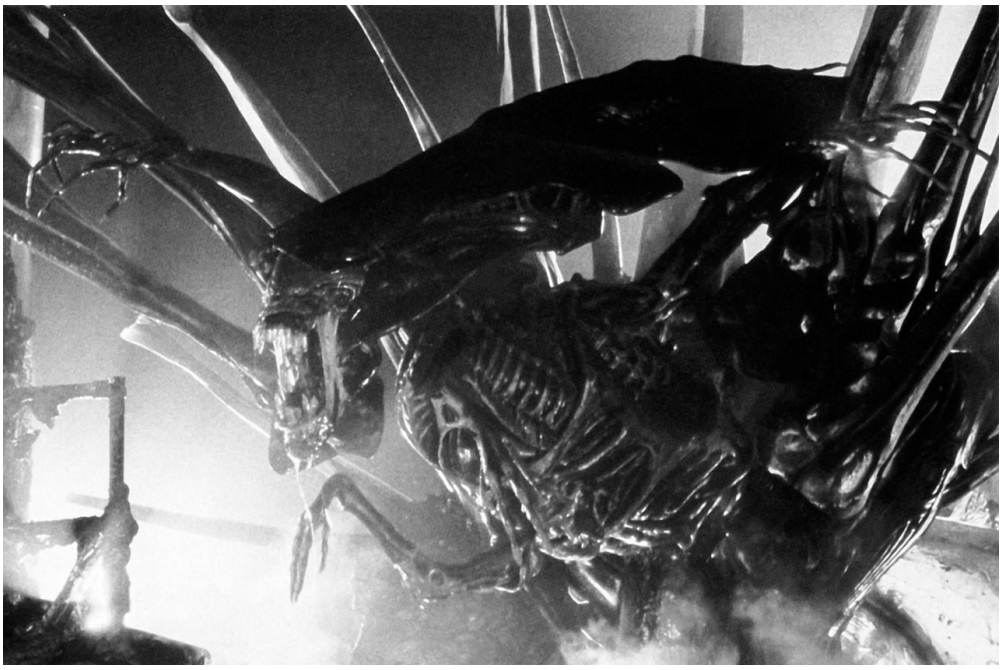
Ripley diverts the giant beast's attention long enough for Newt to scramble safely into a system of trenchlike service channels just below the deck, then runs for one of the giant sliding doors leading out of the cargo hold. The queen is only a step or two behind her, but the heavy door slams shut between them. Turning back, the queen eyes Newt through the grillwork floor and begins pulling up panels to get at her. Suddenly the door slides open to reveal Ripley inside the power-loader, poised and ready for battle.

"In photographing the warriors," said Jim Cameron, "we tried to be circumspect so as not to make them look like men in suits. That was always a concern. With the queen, however, we felt sure that it would hold up because it clearly *isn't* a person. It has extra limbs and spines and other features that defy normal human geometry, and we therefore knew we could show it longer without blowing the game. All we had to do was make it look nonmechanical — which proved not to be a major problem, given Stan Winston's handiwork and my own tendency to shoot action scenes in very quick cuts. We were even able to speed things up a bit by shooting some of the shots at 12 or 16 frames per second." For a full five days, Jim Cameron orchestrated his climactic no-holds-barred battle of the titans — positioning and repositioning his combatants through a carefully choreographed slugfest that ended with both queen and power-loader tumbling into the open airlock and being blown out into space by the unremitting Ripley.

"During the fight," said John Richardson, "there were a lot of different things happening all at once. In fact, for the scenes where we had the alien queen and the power-loader working together, the whole stage was full of special effects people pulling wires and pushing levers. It was quite a sight. Frankly, though, I was a little bit worried about our loader's ability to







retained from the L.A. Effects Group team and were frantically trying to keep up with the escalating workload. In progress was the drop-ship photography — forty-some shots, none of them easy. Yet to be started were other major scenes involving sectional miniatures of the atmosphere processing station, two differently-scaled versions of the *Sulaco*'s cargo hold, the miniature egg chamber and the rod puppet battle between the power-loader and the alien queen. With Brian Johnson on the team, an informal triumvirate was quickly established. Egos and job titles harmoniously set aside, the work remaining was handled collectively or parceled out to whomever seemed best suited to a particular shot or sequence.

"*Aliens* is not a mind-bending technical production," stated Johnson, "at least not as far as miniatures and opticals are concerned. The real ground-breaking stuff was in other areas — John Richardson's power-loader and Stan Winston's full-size queen, especially. For the kinds of things *we* were doing, Jim's whole philosophy was to keep everything simple. If you want a drop-ship flying over a planet, you build a miniature drop-ship and you build a miniature landscape and you fly the thing by on wires. Nevertheless, the drop-ship shots were among the most difficult and time-consuming from the point of view of the scale that we were shooting in and the fact that Jim was progressively speeding up the action. We knew that with models on wires and miniature settings it would be necessary to shoot at high-speed to smooth out the moves and create a believable sense of mass. The problem was that Jim wanted the action to be a lot faster than originally envisioned, I think. As a result, the models — and sometimes the camera — had to be moving *really* fast to compensate for the fact that what we were actually doing was photographing in slow motion. On some of the shots, we were running as high as 120 frames per second. We needed to get a feeling of moving through the set and the only way to do that was to go as fast as we could and then progressively lower the frame rate until we found something that was acceptable. There were some terribly fast tracking maneuvers. Unfortunately, we didn't have time to devise any major rigs to accomplish these kinds of moves. All we could do was adapt what we had."

The principal flying rig for the drop-ship was constructed by senior effects technician Jonathan Angell. "When that rig was put together," said Bob Skotak, "all we had was a sense from talking to Jim of what he wanted. Some of the shots weren't storyboarded — at least in final form — and our schedules were such that we couldn't afford the time to sit down with a piece of paper and engineer this thing with any great detail. So we

*In early preproduction, Stan Winston and his people developed a prototype body plate suspended from a crane arm to test the feasibility of incorporating live performers inside the queen. Stuntmen Dick Warlock and Ed Matthews were the first to try it out, using makeshift extensions to simulate the queen's outstretched arms. / The next phase was to encase the stunt performers in a mockup queen constructed from black foam-core and plastic trash bags. / Once the basic idea was determined to be workable, an aluminum-reinforced fiberglass shell — into which the stuntmen would eventually be placed — was constructed and then covered with wire mesh and used as a sculpting armature. John Rosengrant*

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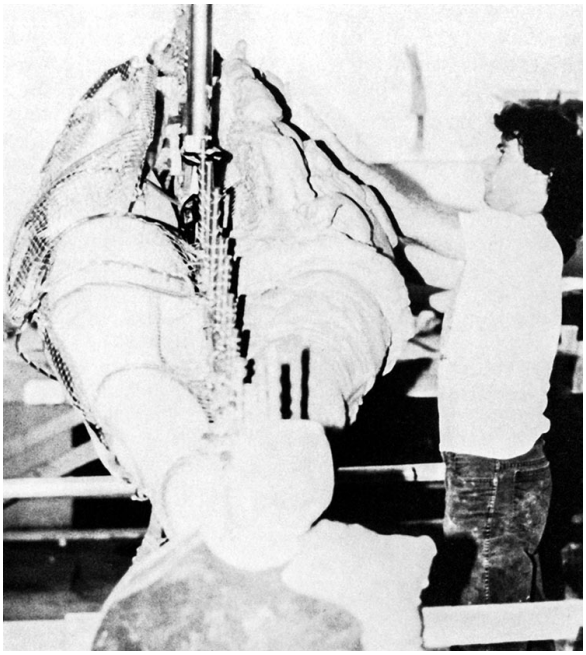

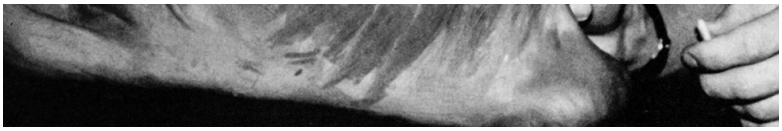

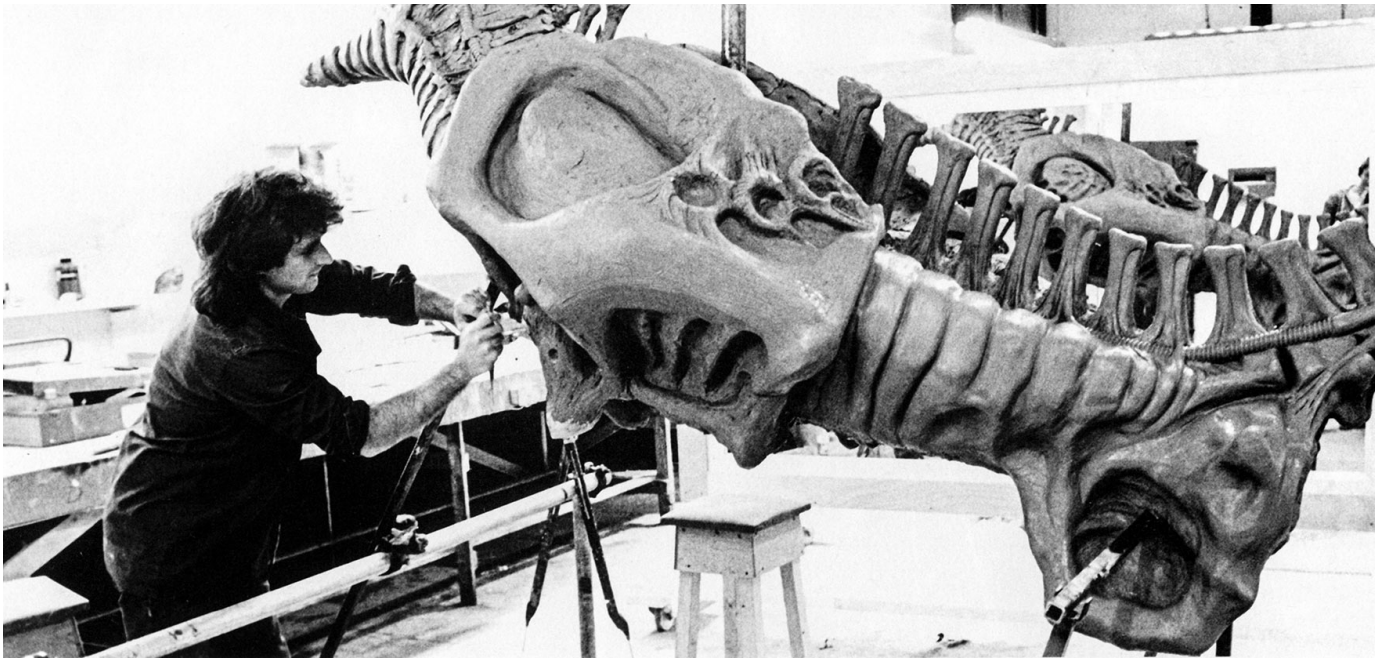

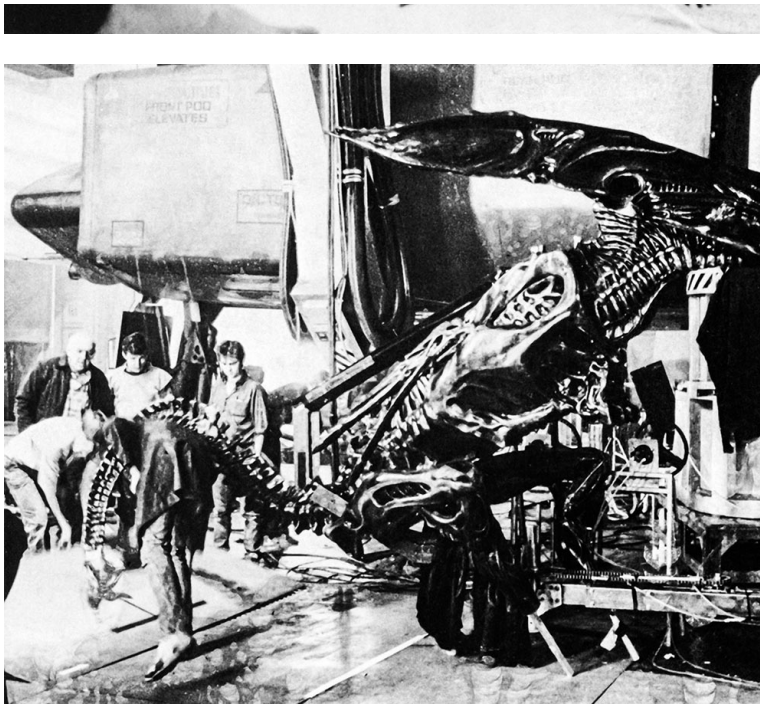
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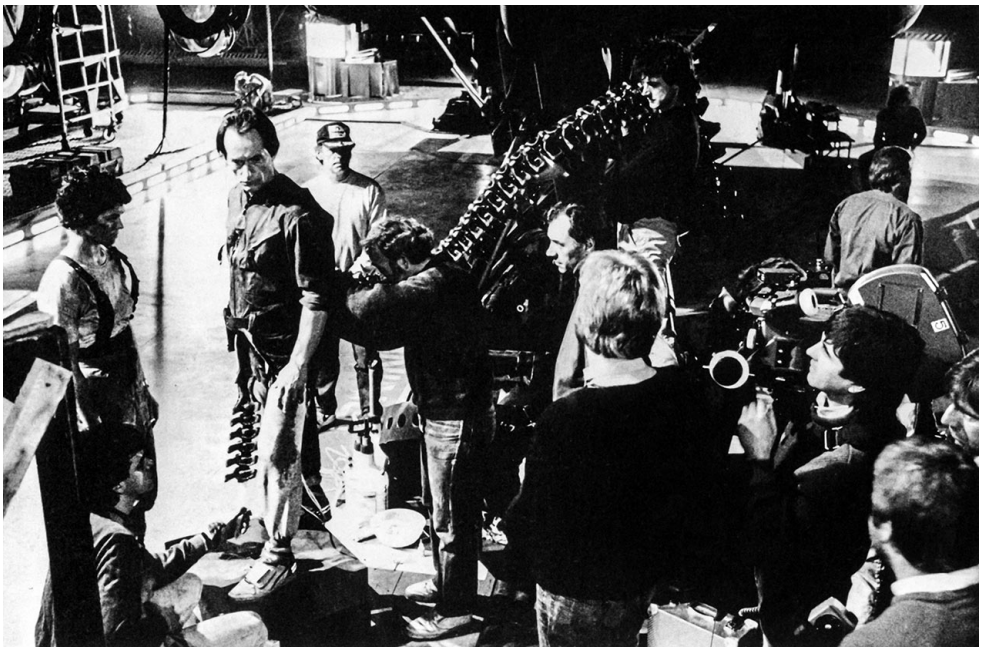
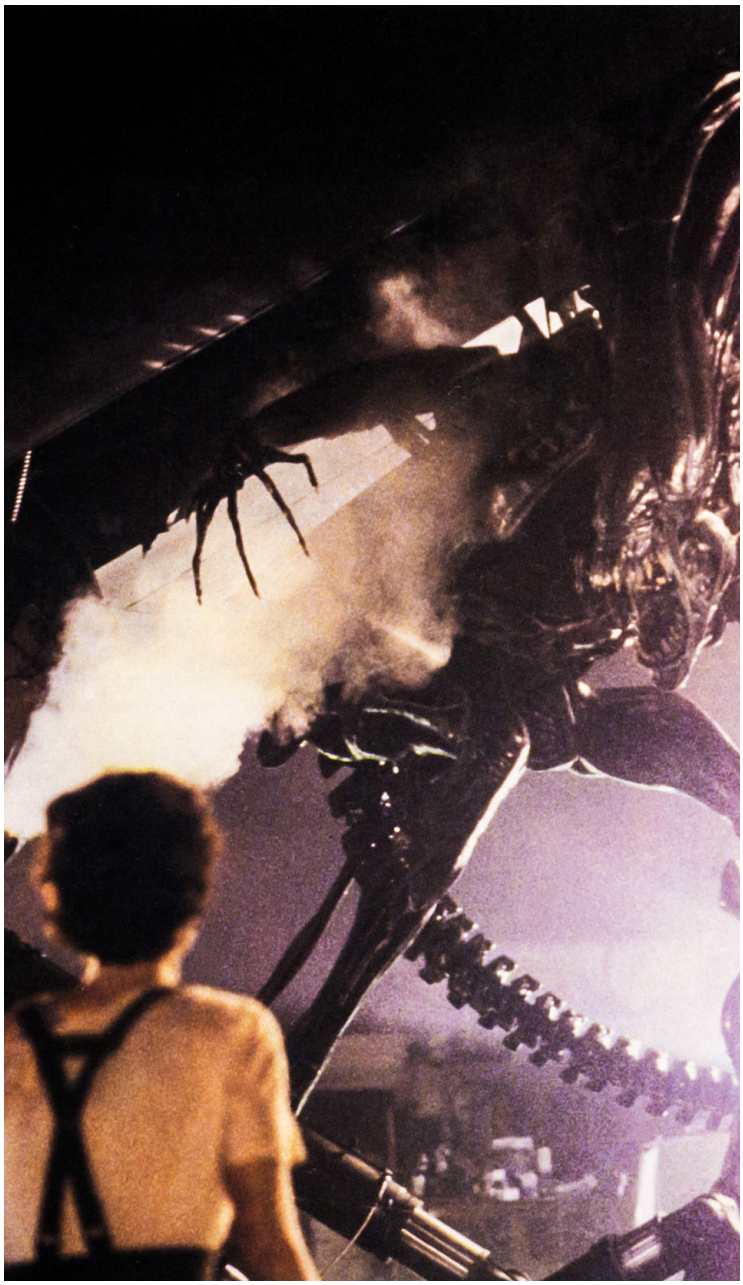


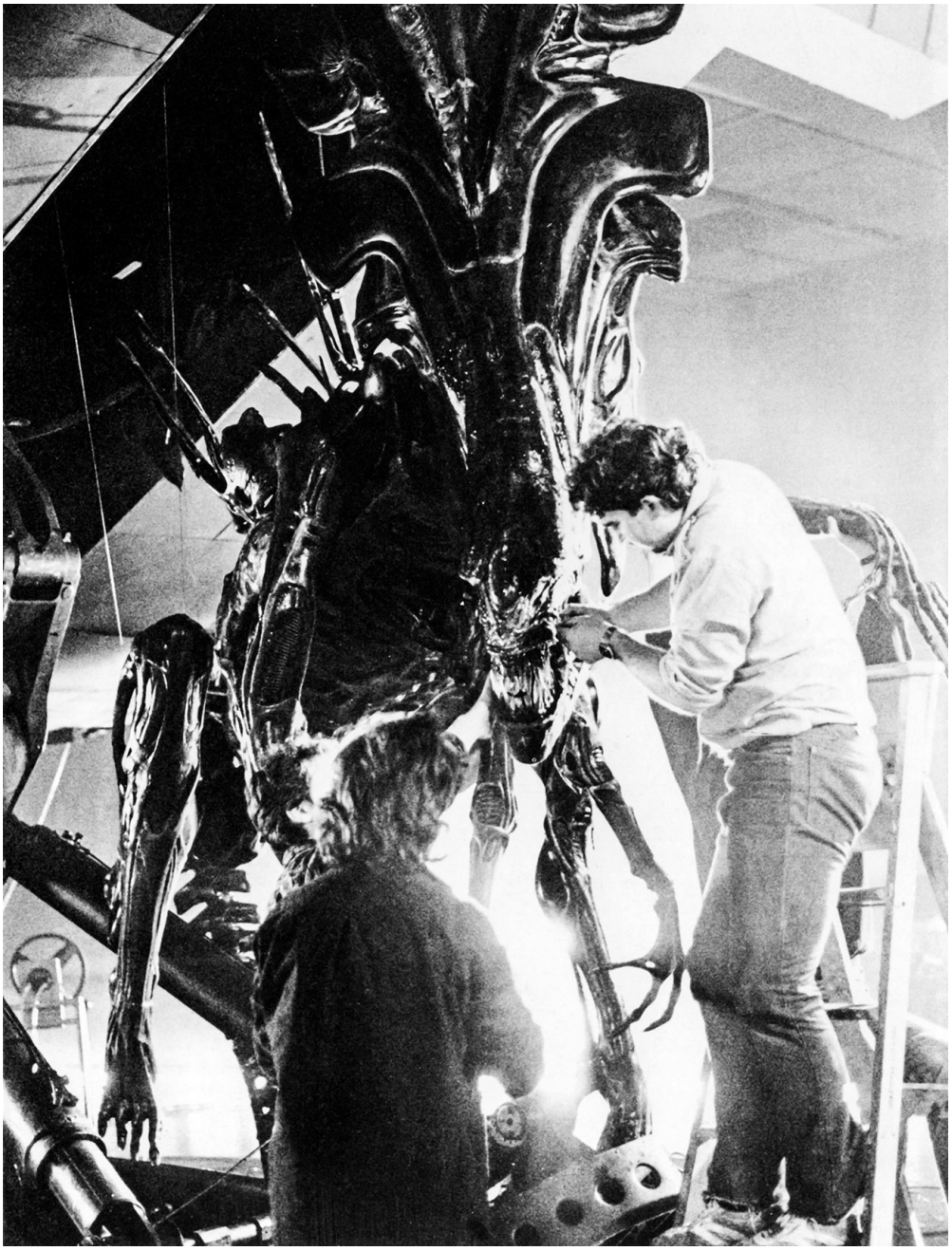
it side-to-side mobility. Those were about the only functions we could give the character because of its design — it was very cut and dried. The legs were just free-animated so that they could be controlled through the floor by rods to make it walk."

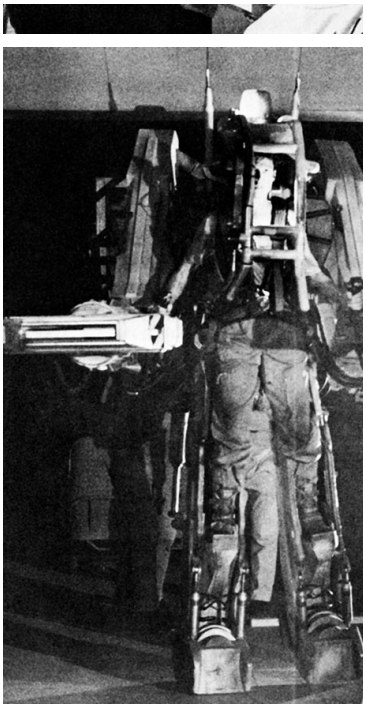
While Phil Notaro assembled the intricate internal workings of the power-loader, Jim Belohovek was making the patterns from which its outer shape would be fashioned. "Unlike the alien queen, which was a sculpted form," commented Beswick, "the power-loader was constructed like a model because of its symmetrical configuration and its hard, flat lines. Working from the photos and drawings we were getting from London, Jim made patterns for all the basic shapes out of plastic, bondo and wood. From those, Tony Gardner made silicone RTV molds with stone backings — and those molds, in turn, were used to produce a fiberglass outer shell for the loader."

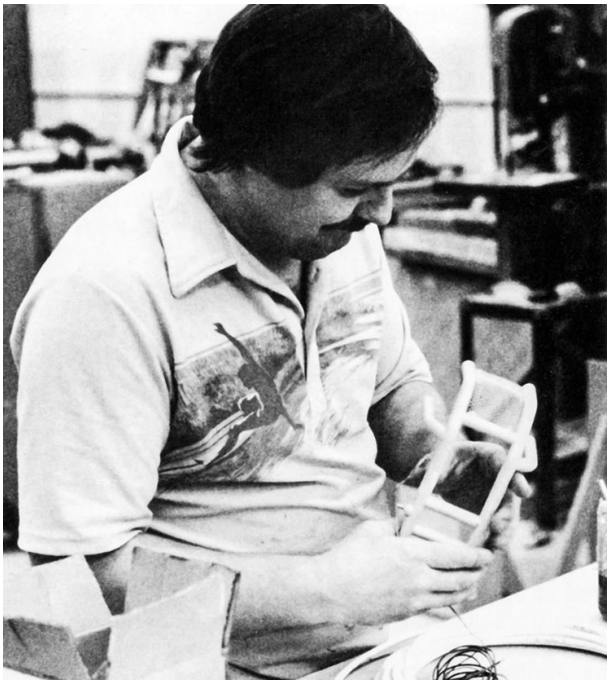
"Once I finished the aluminum substructure," noted Notaro, "we attached the fiberglass pieces to the main frame. To keep everything as light as possible, the fiberglass was held up from the mechanism by little aluminum standoffs — so it was essentially hollow. Then the pieces were seamed together — either glued together and patched, or a trim piece was put over the seam to make it look like it was one solid piece. Each piece built on top of another so that by the time it was finished, it was one pretty solid unit. We used a very thin fiberglass for the outer shell because puppets have a tendency to become too heavy. The lighter a puppet is, the more responsive it is and the easier it is to handle and operate. As it turned out, however, we probably made the structure lighter than it should have been. We didn't know at that time that it was going to be abused as badly as it was — Jim Cameron really got carried away with those puppets once he had them on the set." The finished power-loader — nearly thirty inches tall — was topped off with a rotating beacon to match the light atop the full-scale vehicle. "It was just a halogen bulb with a little pyrex dome that was dyed amber and stuck on top. We were a little concerned about how it would hold up, but the rotating beacon turned out to be the most durable part of the puppet."

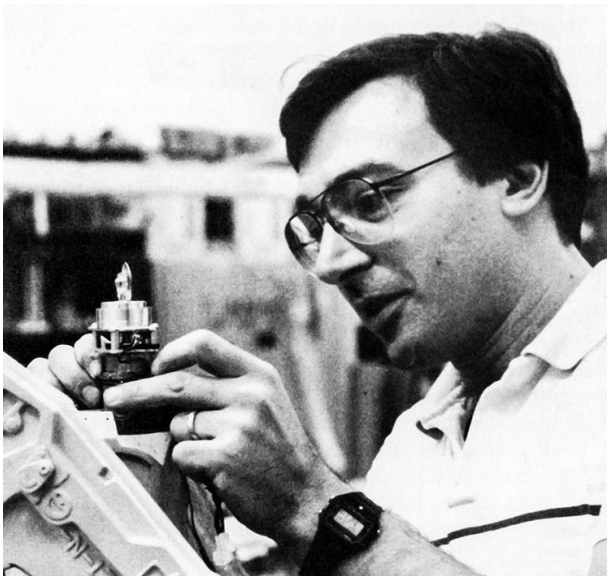
As with the queen, the power-loader functions were controlled by joysticks, requiring one puppeteer to control the body movement and four more to operate the arms — two on each. Fortunately, its stocky build helped to hide the cables which actuated it. "The legs of the power-loader were quite wide," Notaro remarked, "and, luckily, most of the shots of it were from the side or in three-quarter profile. Very few were dead straight on. As a result, we were able to drop the cables down through the butt and wrap them around the support post that came down between the legs and into the floor. Then, by painting them either yellow — which was the basic color of the loader — or whatever color the background happened to be, they completely disappeared. You'd never know they were there."











time, because we could see how everything fit together and we could adjust the various parts right then and there. We didn't have to wait for an optical or a double-exposure later on. By shifting the elements we could change the perspective or maybe get a ship to work better, and we had the advantage of actually seeing the whole thing through the camera."

For the Skotaks and their assistant, Rashid Khares, the Gateway shot became an exercise in shooting precisely to time. "The picture was locked at that point," Bob Skotak affirmed, "so we knew exactly how long our shot had to be, right to the frame. Since it was to be done entirely in-camera, we had to lay out the elements in such a way that they were all adjustable. The artwork of the earth, the artwork of the station, the model of the station, the ships, the starfields — all were set up so that we could expand them out for a wider pan or compress them for a shorter pan. We tried varying combinations of distance and speed to find one that looked right without strobing. That's one of the reasons we did the shot at Arkadon. With their field recorder system we could record our final move and then repeat it as many times as was needed. We did three passes — a beauty pass for the earth and all the structures; a light pass for the little red warning lights and the other practicals on the miniature; then another pass for the countermatte of the starfield. It went quite well, although there were a few glitches. We started out with a backlit effect, but then Jim decided it would look better if the sun were more central in the shot so that light would rake across the structures. That was no problem for the miniature, but for the artwork — where the lighting effect was painted on — it meant redoing it almost from scratch. Time was short, so in one seventeen-hour period, I repainted over the whole thing and we shot it again. And Jim was right — it looked much better."

Later, on the *Sulaco,* another nontraditional technique was employed to incorporate live-action elements into a full panoramic establishing shot of the miniature cargo hold. During principal photography, a locked-off Vistavision plate had been shot on the full-size cargo hold set as the colonial marines, fresh from their hypersleep, assemble around the drop-ship for a mission briefing. "After our twelfth-scale cargo hold was constructed," said Bob Skotak, "we photographed a series of stills of it, panning all the way around from the rear bay up to the front. It took five shots to get the full panorama. We then enlarged those photos and pasted them together, cheating the perspective so it wouldn't be evident that what we had was a segmented curve. The idea then was to use a beam-splitter to combine the still photographs with the live-action plate material, thereby revealing the entire cargo hold in one 90-degree pan. What was tricky about the shot was that we were going from still photograph to motion picture plate in the middle, and the

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where the planet filled the frame, the clouds were actually a mixture of baking powder and microballoons sprinkled onto a sheet of glass. Then, below that, we had a painting of the planet surface that was rear-projected. For longer shots, where the curvature of the planet was visible, we used dome projections. The dome itself was about six feet in diameter, and on either side of it we set up slide projectors and masked them off with little pieces of cardboard to produce a kind of penumbral shadow. Then, to create a slight sense of rotation, we mounted the slide projectors on stepper motor rigs that actually panned the still images across the surface."

The basic matting techniques employed on the *Sulaco* would also be used on the few remaining drop-ship shots. Though the ships themselves would be shot via motion control, the background plates would not. Those, in fact, were already in the can, having been photographed at Pinewood prior to the move to Arkadon. Thus, computer-controlled models were bipacked with manually rigged background plates to produce finished composites of the drop-ship encircling the atmosphere processing station early in the film and later passing through one of the giant heat radiators and into the maw. Even the cloud bank into which the drop-ship disappears shortly after its initial launch was produced on the Pinewood effects stages. "We took a lot of fiberfill and teased it out over an area about twenty-five by thirty feet," said Johnson. "Then we got a big crane and tracked in on it and punched down through the stuff and did about fifty passes on that until we got some that Jim liked. Then we did a motion control pass on the drop-ship and just popped it in, adding a bit of diffusion and low-contrast flashing at the end to make it look as though it actually disappeared into the clouds." Of necessity, one of the drop-ship shots had to be done via bluescreen. "The unfolding drop-ship model was not designed with motion control in mind since the original plan had been to shoot it in real time with a process background. I decided later that motion control would be a better way to go, but by then it was too late to go in and have the model rebuilt to our specifications. So when it came time to do the drop-ship unfolding its wings and gun pods, we had to use radio-control servos and little gadgets like that to motorize everything — which worked fine, but it wasn't a repeatable system so we had to go with bluescreen."

Most complex of the motion control shots was the initial launch of the drop-ship — a severe up-angle view of the tiny craft as it falls away from the *Sulaco*, plunges rapidly toward camera and then veers off and descends into the atmosphere of Acheron. "At first we were going to try to do it all in-camera," said Johnson, "but it was just too complicated, so we ended up generating our mattes and making color separations and putting the whole thing together in the optical printer. That way we had a lot more